

Kanopolis Lake 1999 Water Quality Report

1. General.

a. **Project location.** Kanopolis Dam is located approximately 14 miles east and 8 miles south of Ellsworth, Kansas, at river mile 183.7 on the Smoky Hill River, a tributary of the Kansas River. The project watershed encompasses 2,300 square miles and extends to Cedar Bluff Dam.

b. **Authorized project purposes.** Flood and silt control, low flow supplementation, and water quality are the primary project purposes; equally important, however, are its fish and wildlife resources and recreation benefits.

c. Pertinent data.

Pools	Surface Elevation (ft. above m.s.l.)	Current Capacity (1,000 A.F.)	Surface Area (acres)	Shoreline (miles)
Flood Control	1,508	368.1	13,900	134
Multipurpose	1,463	50.3*	3,400	41
Inactive		22.8		
Total		418.4		

Total Drainage Area: 7,857 sq. miles

Average Annual Inflow: 220,993 acre-feet

* Contained in multipurpose pool.

2. Activities and studies of the year.

Monthly herbicide and nutrient sampling was conducted by lake project personnel, with technical and analytical support from PM-PR-W, April-September 1999 at one inflow station, two lake stations (two depths), and the outlet. Nutrient samples were shipped to the Chemical and Materials Quality Assurance Laboratory (CMQAL) in Omaha for analysis while the herbicide samples were shipped to the PM-PR-W laboratory for analysis of four of the most commonly occurring herbicides by the ELISA (enzyme linked immunosorbent assay) method. Ten percent of the herbicide samples were shipped to the CMQAL to be analyzed by GC (Gas Chromatography) for quality control purposes. All generated data were entered in excel spreadsheets as an interim to the EPA national water quality data management system, NEW STORET, which is still in the developmental stage. Table 1 at the end of this report includes all the available nutrient and herbicide data for the years 1996-1999.

The OF-KA is to be commended for its continued support of water quality monitoring of Kanopolis Lake and its tributaries. The OF-KA personnel deserving special recognition include Messrs. Larry Smith, Dan Hays, Charlie Spongberg, Kent Latimer, and Ken Nelson.

3. Existing conditions.

FIGURE 1: KA-14

a. Inflow.

The monthly nutrient sampling resulted in total nitrogen (TN) concentrations (i.e., $\text{NH}_3 + \text{TKN} + \text{NO}_2 + \text{NO}_3$) ranging from quite eutrophic (2.81 mg/L) to moderately enriched (1.23 mg/L). The mean TN concentration for 1999

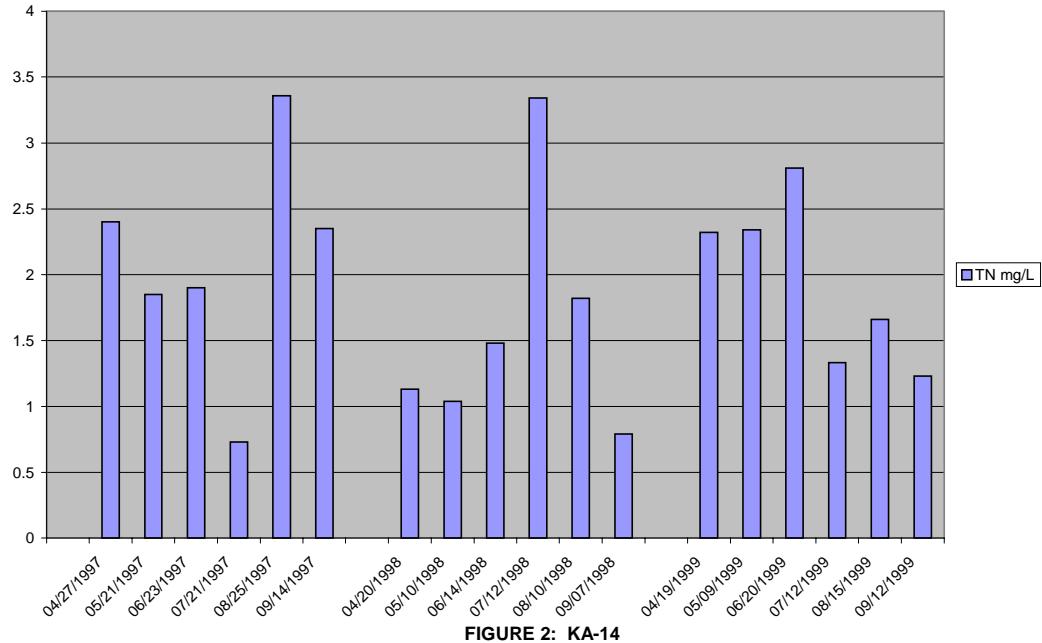
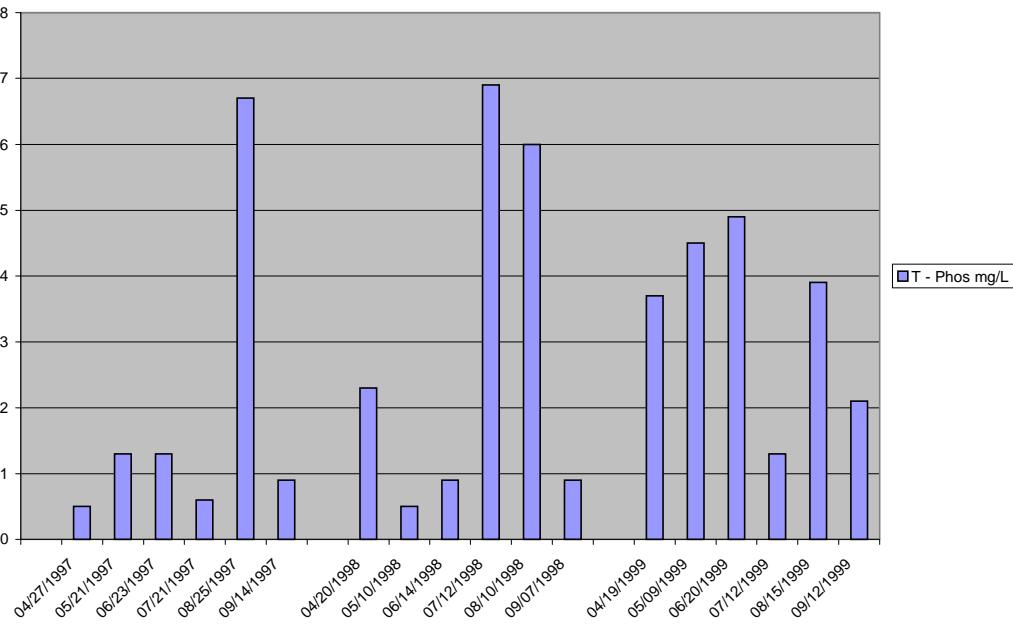


FIGURE 2: KA-14

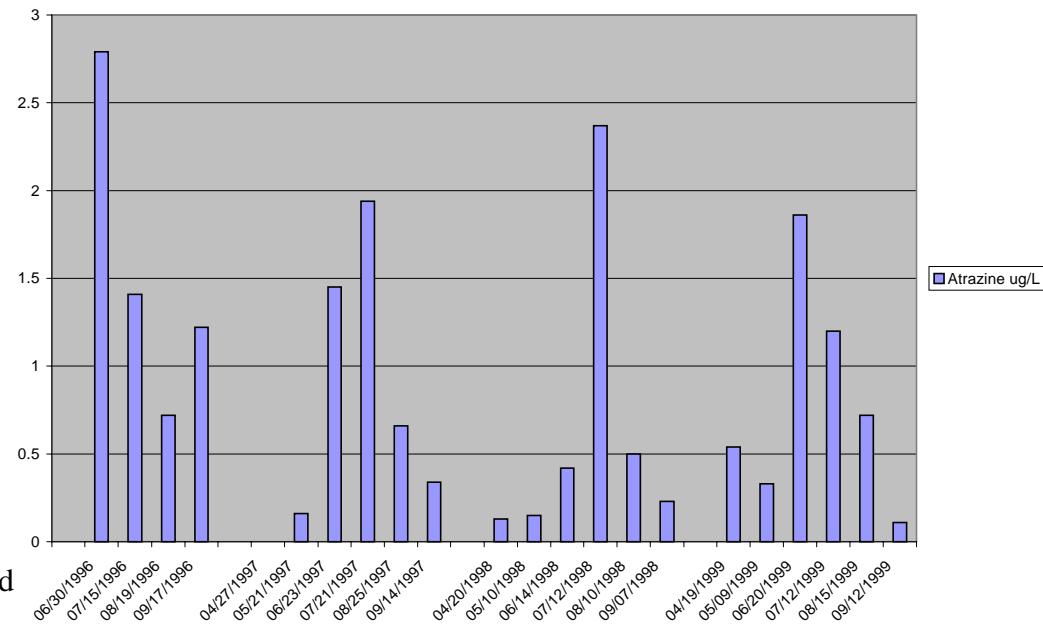
was 1.95 mg/L which was well above eutrophic levels (>1 mg/L). Figure 1 shows the trend for total nitrogen concentrations over the past three years. As can be seen from this graph, levels have typically been above eutrophic levels



with spikes occurring during high inflows such as June 1999. Total phosphorus concentrations exhibited similar eutrophy ranges with mean, minimum, and maximum concentrations of 0.34 mg/L, 0.13 mg/L, and 0.49 mg/L, respectively. Total phosphorus concentrations were above the Environmental Protection Agency (EPA) suggested stream criterion of 0.1 mg/L for the protection of aquatic ecosystems in 1999. The trend for the last three years shows levels close to or above the 0.1 mg/L stream criterion (figure 2). These parameters indicate substantial nutrient loading in the Smoky Hill River inflow.

FIGURE 3: KA-14

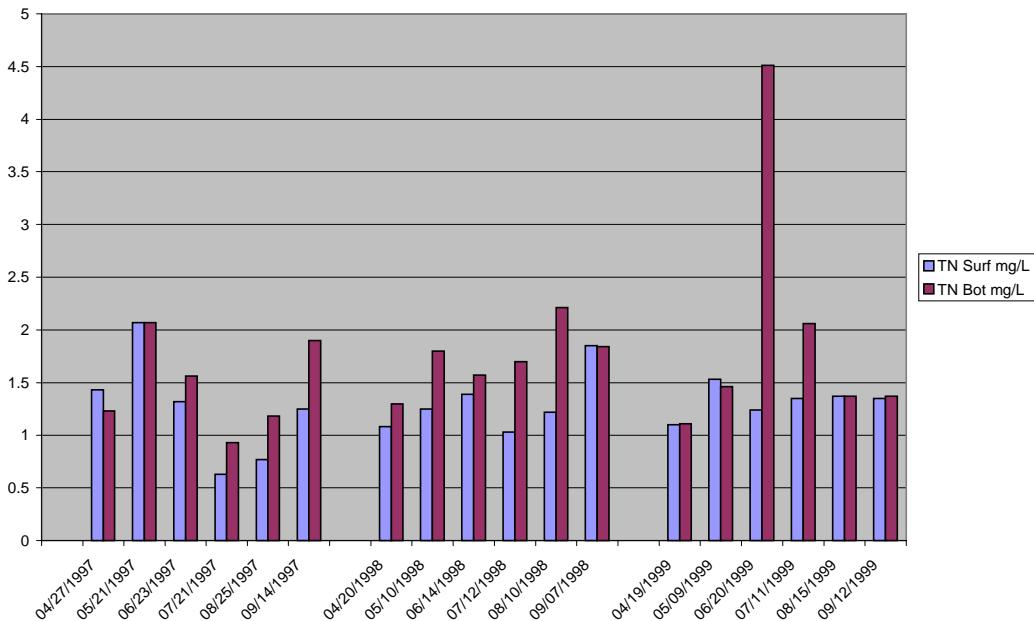
The four herbicides (atrazine, metolachlor, alachlor, and cyanazine) were detected in the inflow waters. Atrazine was detected in 100% of the samples with a mean and maximum concentration of 0.79 ug/L and 1.86 ug/L,



respectively. None of the samples exceeded the EPA maximum contaminant level (MCL) of 3 ug/L for drinking water. The trend for the

FIGURE 4: KA-3

past four years is shown in Figure 3. Alachlor and cyanazine were detected but quantities were so low, neither was in danger of exceeding the established



criteria of 2 ug/L for alachlor and 1 ug/L for cyanazine. Metolachlor was detected

but concentrations were extremely low with a mean of 0.36 ug/L.

b. Lake.
Stations KA-3 (downlake) and KA-6 (uplake) were sampled during the six-month sampling period from

April-September. As can be seen in figures 4 and 5, nutrient concentrations were typical of the impoundment over the period of record. These two graphs show the relationship between surface and bottom concentrations for the past three years. Concentrations within the water column appear to be fairly uniform. The high spikes seen at times can be attributed to high inflows and temperature differences between surface and bottom waters. The 1999 mean and maximum total nitrogen concentrations in the surface waters were 1.32 mg/L and 1.53 mg/L, respectively, at KA-3, and 1.69 mg/L and 2.14 mg/L, respectively, at KA-6.

Concentrations in the bottom waters differed somewhat with those of the surface waters with mean and maximum concentrations of 1.98 mg/L and 4.51 mg/L, respectively, at KA-3, and 2.20 mg/L and 3.48 mg/L, respectively, at KA-6. Both TN and TP

FIGURE 5: KA-6

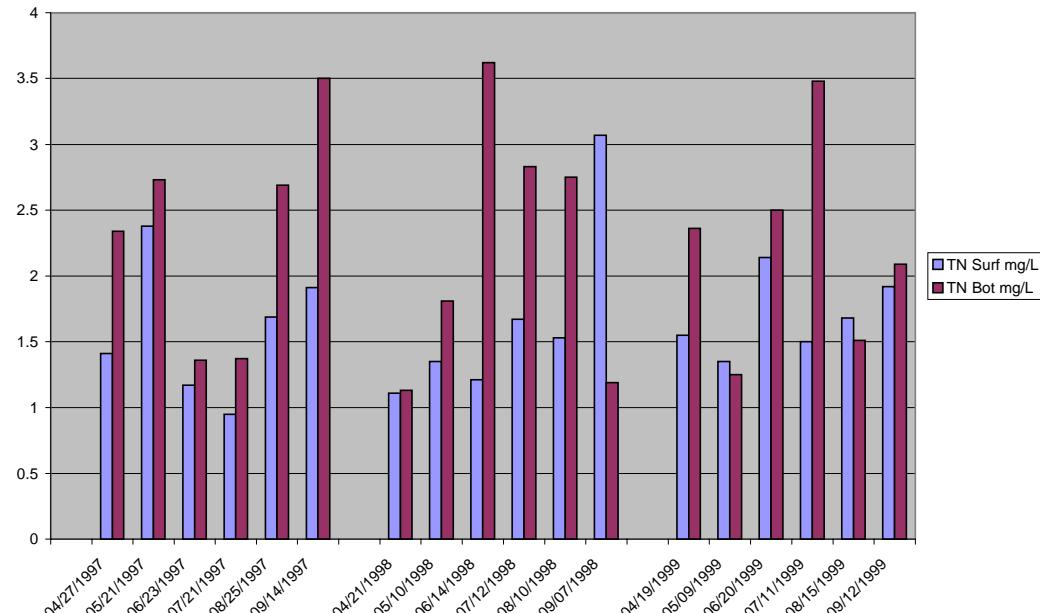
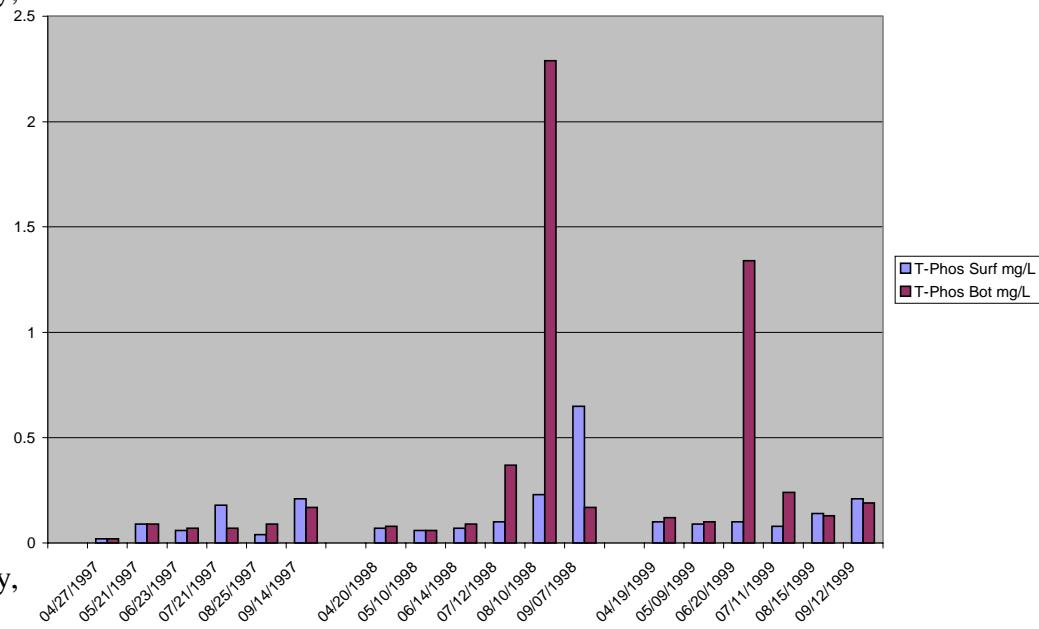
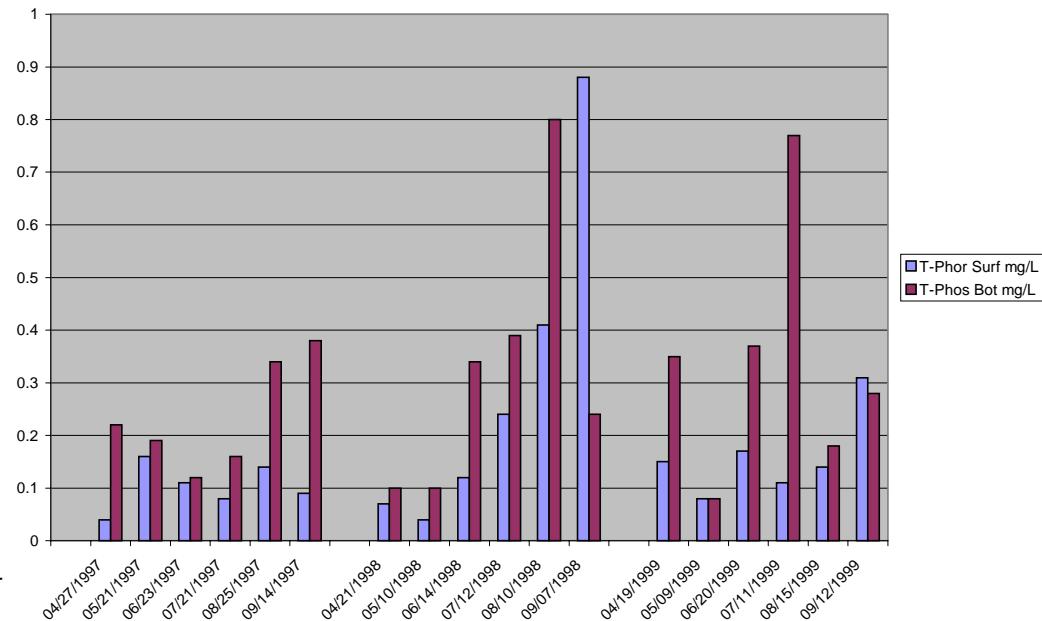


FIGURE 6: KA-3



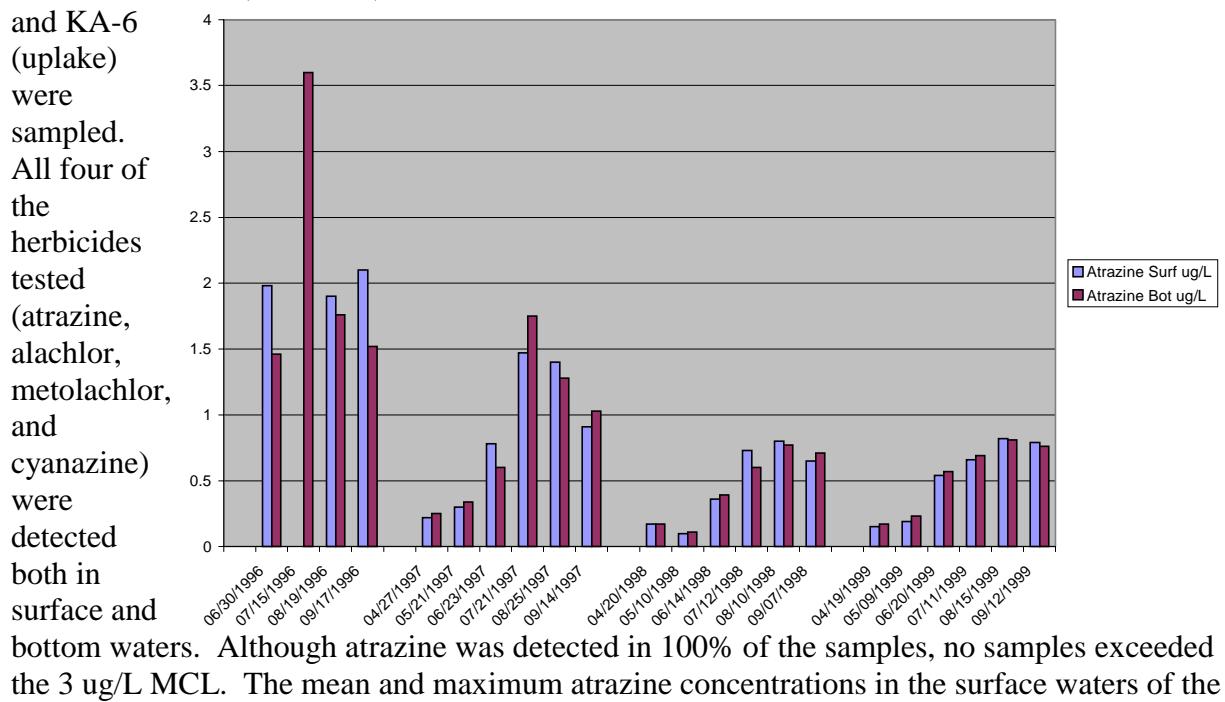
concentrations contributed to the eutrophic condition of the lake. Mean and maximum concentrations of total phosphorus in the surface waters were KA-3, 0.12 mg/L and 0.21 mg/L, respectively; and KA-6, 0.16 mg/L and 0.31 mg/L, respectively. Mean and maximum total phosphorus concentrations in the bottom waters were KA-3, 0.35 mg/L and 1.34 mg/L, respectively; and KA-6, 0.34 mg/L and 0.77 mg/L, respectively. Figures 6 and 7 show the relationship of concentrations at the surface and bottom depths throughout the lake from 1996-1999. Nutrient levels have been moderately enriched over the period of record.

FIGURE 7: KA-6



In the six-month sampling period for herbicides, KA-3 (downlake),

FIGURE 8: KA-3



lake were 0.53 ug/L and 0.82 ug/L, respectively, at KA-3 and 0.60 ug/L and 0.90 ug/L, respectively, at KA-6. Bottom mean and maximum atrazine concentrations were 0.54 ug/L and 0.81 ug/L, respectively, at KA-3 and 0.63 ug/L and 1.05 ug/L, respectively, at KA-6.

Figures 8 and 9 show the trend for atrazine for the years 1996-1999. As can be seen from these graphs, high concentrations usually occur in early spring or periods of high flow. Concentrations throughout this period appear

uniform within the water column. In 1999 concentrations were relatively low throughout the lake. Although cyanazine, metolachlor, and alachlor were detected in over 50% of the samples, none were present in high concentrations.

c. Outflow. The water quality of the downstream reach (KA-2)

maintained most of the qualities of the bottom withdrawal waters. Total nitrogen and total phosphorus mean concentrations remained moderately enriched at 1.26 mg/L and 0.13 mg/L, respectively.

Again, as shown

FIGURE 9: KA-6

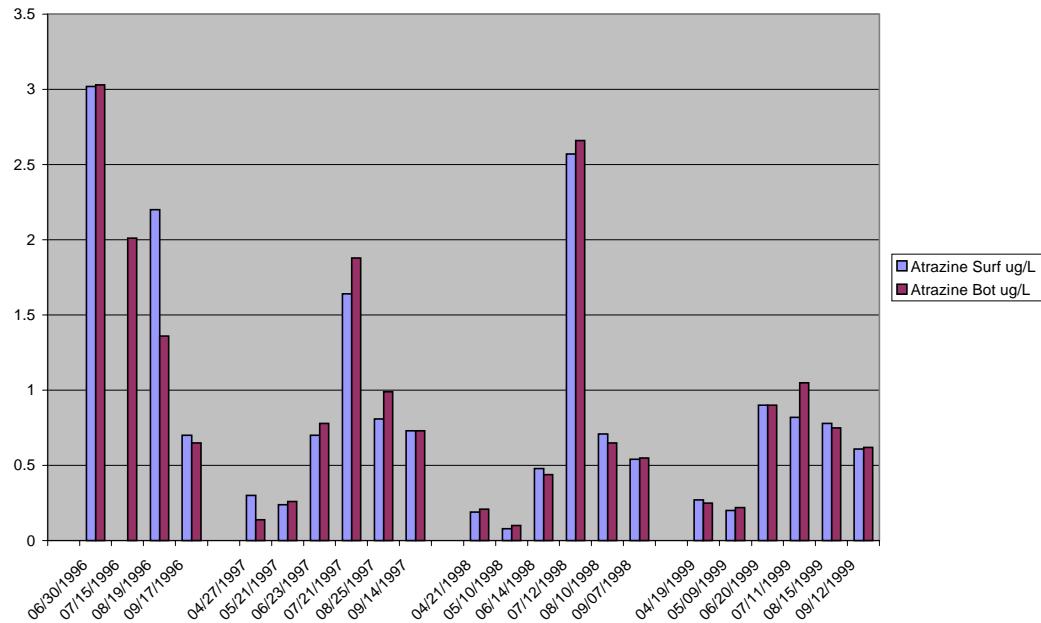
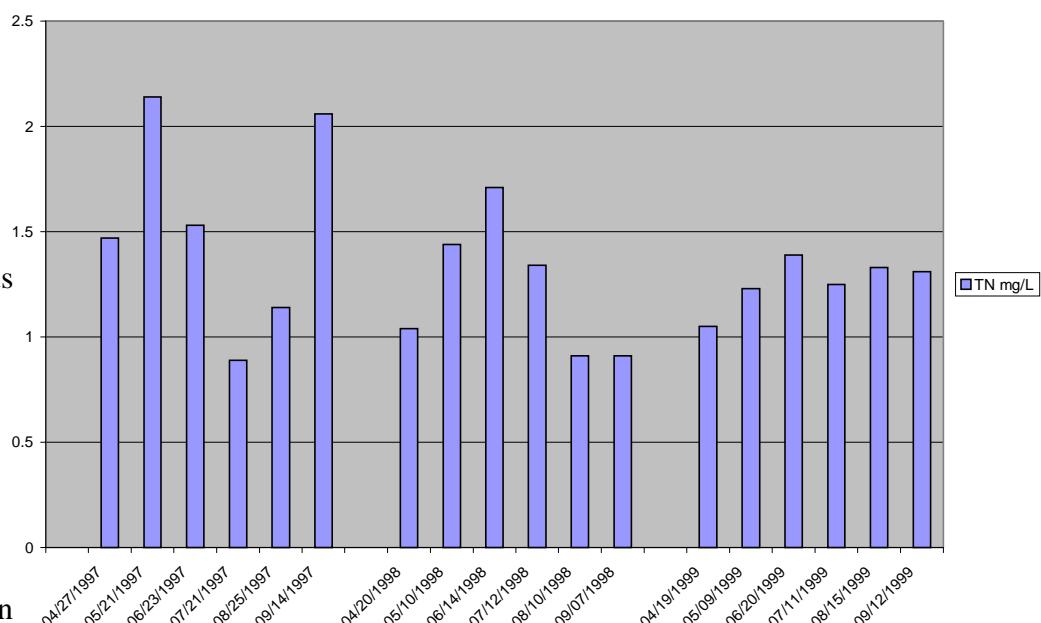


FIGURE 10: KA-2



in figures 10 and 11, concentrations are higher during the high run-off periods.

Also, concentrations of atrazine, alachlor, metolachlor, and cyanazine were very similar to those of bottom downlake waters in 1999.

All four herbicides were detected in the monthly samples however none of the four exceeded any established criteria. Atrazine had the greatest concentrations with a mean and maximum of 0.51 ug/L and 0.74 ug/L, respectively, in the released waters.

The trend for the past four years is shown in figure 12.

FIGURE 11: KA-2

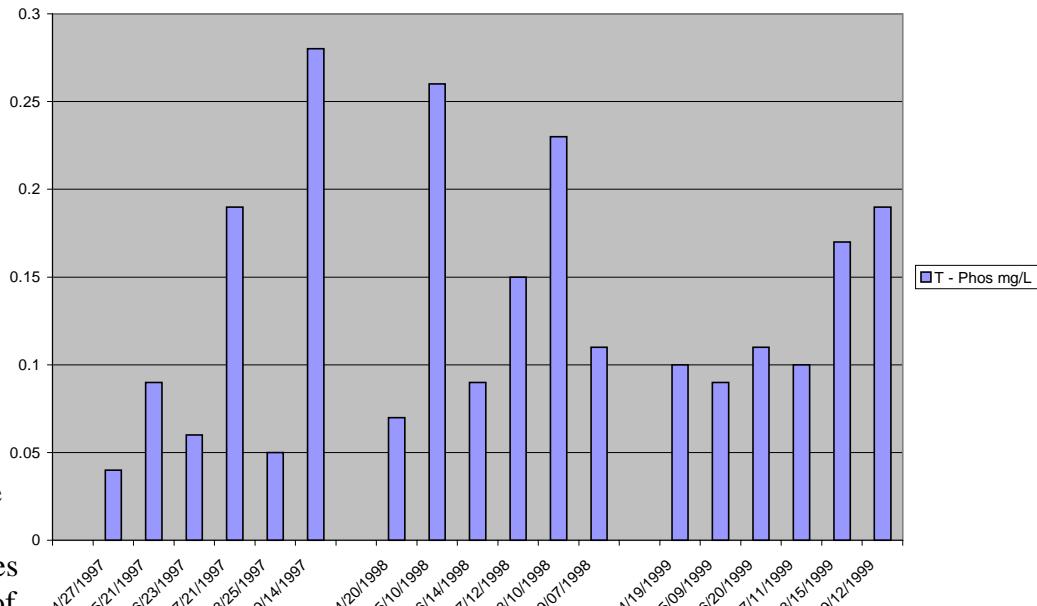
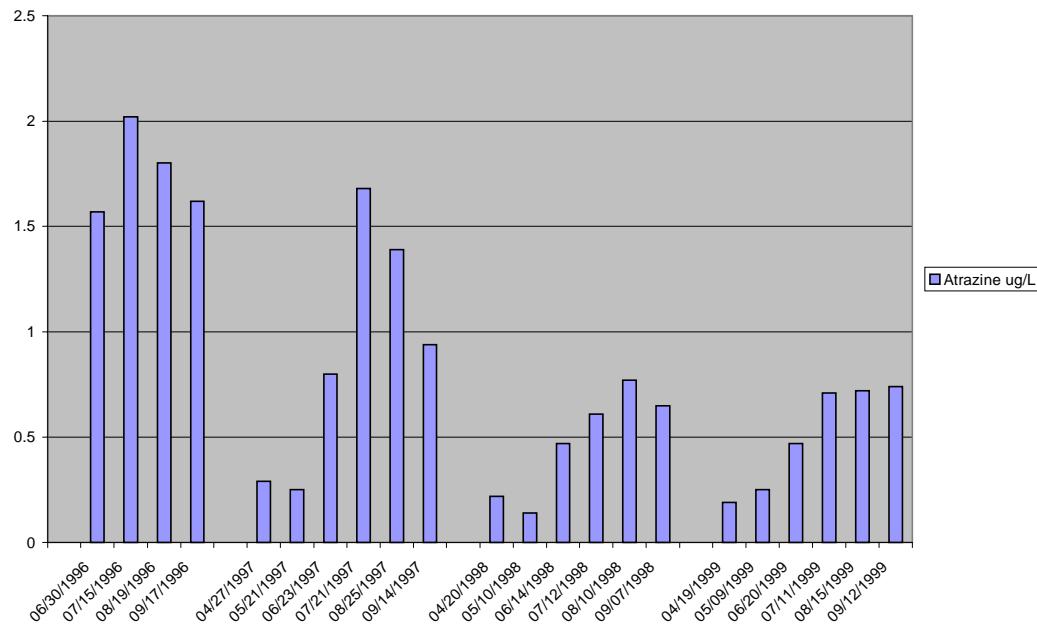


FIGURE 12: KA-2



4. Future conditions.

The water quality of Kanopolis Lake continues to be moderately good. However the lake's future water quality, sport fishery, and use as a recreational area may be adversely affected by more intensive agricultural practices. Increased erosion, irrigation, fertilization, and herbicide

usage would increase the concentration of suspended and dissolved solids, nutrients, and pesticides. Little can be done for the saliferous problems because of the geologic nature of their source.

5. Recommendations.

With the current staffing and funding levels, the water quality surveillance program for Kanopolis Lake will continue to be limited to routine monthly surveillance of nutrients and herbicides by the Project personnel with logistical and analytical support from PM-PR-W. The District should enlist the other state and Federal agencies in developing an expanded cooperative water quality monitoring and abatement program for Kanopolis Lake and its watershed in 2001 similar to the one currently underway for Hillsdale Lake and the Big Bull watershed.

TABLE 1: KANOPOLIS LAKE DATA 1996-1999

Station	Depth M	Date mm/dd/yyyy	Time hh/mm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
KA - 14	0.1	06/30/1996	0955	2.79	0.2	0.31	0.15						
	0.1	07/15/1996	1915	1.41	<0.05	<0.05	0.05						
	0.1	08/19/1996	1422	0.72	0.05	0.08	0.12						
	0.1	09/17/1996	1120	1.22	<0.05	0.08	0.05						
Average				1.54	0.13	0.16	0.09						
KA - 14	0.1	04/27/1997	0830	<0.05	<0.05	<0.05	<0.04	0.89	0.01	1.5	2.4	0.05	0.03
	0.1	05/21/1997	1539	0.16	<0.05	<0.05	0.06	0.04	0.01	1.8	1.85	0.13	0.02
	0.1	06/23/1997	0841	1.45	0.71	<0.05	0.07	0.06	0.04	1.8	1.9	0.13	0.02
	0.1	07/21/1997	0910	1.94	0.45	0.35	0.11	<0.02	0.03	0.7	0.73	0.06	0.02
	0.1	08/25/1997	0825	0.66	0.07	<0.05	0.05	0.08	0.58	2.7	3.36	0.67	0.18
	0.1	09/14/1997	1352	0.34	0.06	<0.05	<0.04	0.08	0.07	2.2	2.35	0.09	0.05
Average				0.91	0.32	0.35	0.07	0.23	0.12	1.78	2.10	0.19	0.05
KA - 14	0.1	04/20/1998	0810	0.13	<0.05	<0.05	<0.04	<0.02	0.43	0.7	1.13	0.23	0.08
	0.1	05/10/1998	1547	0.15	<0.05	0.06	<0.04	0.02	0.02	1	1.04	0.05	0.01
	0.1	06/14/1998	1737	0.42	<0.05	0.12	0.08	<0.02	0.08	1.4	1.48	0.09	0.03
	0.1	07/12/1998	1727	2.37	0.74	0.81	0.19	0.17	0.37	2.8	3.34	0.69	0.09
	0.1	08/10/1998	1614	0.5	0.1	0.08	0.06	0.02	0.3	1.5	1.82	0.6	0.2
	0.1	09/07/1998	1702	0.23	<0.05	<0.05	<0.04	0.13	0.36	0.3	0.79	0.09	0.05
Average				0.63	0.42	0.27	0.11	0.09	0.26	1.28	1.60	0.29	0.08
KA-14	0.1	04/19/1999	1155	0.54	<0.05	<0.05	0.05	U	0.45	1.87	2.32	0.37	0.06
	0.1	05/09/1999	1645	0.33	<0.05	<0.05	<0.04	U	0.32	2.02	2.34	0.45	0.08
	0.1	06/20/1999	1635	1.86	0.28	0.83	0.14	0.06	0.2	2.55	2.81	0.49	0.07
	0.1	07/12/1999	1853	1.2	0.11	0.18	0.11	U	U	1.33	1.33	0.13	0.02
	0.1	08/15/1999	0933	0.72	0.1	0.08	0.04	0.03	U	1.63	1.66	0.39	0.13
	0.1	09/12/1999	1301	0.11	<0.05	<0.05	<0.04	U	U	1.23	1.23	0.21	0.02
Average				0.79	0.16	0.36	0.09	0.05	0.32	1.77	1.95	0.34	0.06
KA - 2	0.1	06/30/1996	0915	1.57	0.13	0.54	0.16						
	0.1	07/15/1996	1710	2.02	0.09	<0.05	0.15						
	0.1	08/19/1996	1340	1.8	0.07	0.33	0.27						
	0.1	09/17/1996	1015	1.62	0.08	0.09	0.15						
Average				1.75	0.09	0.32	0.18						
KA - 2	0.1	04/27/1997	0915	0.29	0.14	<0.05	0.05	0.32	0.05	1.1	1.47	0.04	0.02
	0.1	05/21/1997	1707	0.25	<0.05	<0.05	0.05	0.87	0.07	1.2	2.14	0.09	0.03
	0.1	06/23/1997	1022	0.8	0.51	<0.05	0.08	0.06	0.17	1.3	1.53	0.06	0.04
	0.1	07/21/1997	1005	1.68	0.46	0.23	0.13	0.08	0.11	0.7	0.89	0.19	0.03
	0.1	08/25/1997	0925	1.39	0.21	0.17	0.08	0.09	0.05	1	1.14	0.05	0.04
	0.1	09/14/1997	1431	0.94	0.1	0.09	0.08	0.24	0.32	1.5	2.06	0.28	0.08
Average				0.89	0.28	0.16	0.08	0.28	0.13	1.13	1.54	0.12	0.04

Station	Depth M	Date mm/dd/yyyy	Time hh/mm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
KA - 2	0.1	04/20/1998	0915	0.22	<0.05	<0.05	<0.04	0.09	0.35	0.6	1.04	0.07	0.07
	0.1	05/10/1998	1810	0.14	<0.05	<0.05	<0.04	0.17	0.27	1	1.44	0.26	0.04
	0.1	06/14/1998	2155	0.47	0.08	0.17	0.06	<0.02	0.41	1.3	1.71	0.09	0.05
	0.1	07/12/1998	1806	0.61	<0.05	0.19	0.06	0.38	0.16	0.8	1.34	0.15	0.03
	0.1	08/10/1998	1656	0.77	0.29	0.17	0.1	0.03	0.48	0.4	0.91	0.23	0.18
	0.1	09/07/1998	1452	0.65	<0.05	0.09	0.05	0.08	0.23	0.6	0.91	0.11	0.06
Average				0.48	0.19	0.16	0.07	0.15	0.32	0.78	1.23	0.15	0.07
KA - 2	0.1	04/19/1999	1230	0.19	<0.05	<0.05	<0.04	U	0.07	0.98	1.05	0.1	0.04
	0.1	05/09/1999	0841	0.25	<0.05	<0.05	<0.04	0.17	0.1	0.96	1.23	0.09	0.06
	0.1	06/20/1999	0945	0.47	<0.05	0.16	0.05	U	0.41	0.98	1.39	0.11	0.03
	0.1	07/11/1999	0950	0.71	0.08	0.28	0.09	U	0.22	1.03	1.25	0.1	0.04
	0.1	08/15/1999	0722	0.72	0.11	0.17	0.05	U	0.42	0.91	1.33	0.17	0.09
	0.1	09/12/1999	1422	0.74	0.08	0.14	0.05	U	0.44	0.87	1.31	0.19	0.11
Average				0.51	0.09	0.19	0.06	0.17	0.28	0.96	1.26	0.13	0.06
KA - 3	0.1	06/30/1996	1821	1.98	0.09	0.47	0.19						
	0.1	07/15/1996	1605	<0.05	0.11	<0.05	0.16						
	0.1	08/19/1996	1545	1.9	0.09	0.38	0.29						
	0.1	09/17/1996	1235	2.1	0.06	0.3	<0.1						
Average				1.99	0.09	0.38	0.21						
KA - 3	0.1	04/27/1997	1330	0.22	<0.05	<0.05	<0.04	0.13	.01K	1.3	1.43	0.02	0.02
	0.1	05/21/1997	1800	0.3	<0.05	<0.05	0.06	0.74	0.03	1.3	2.07	0.09	0.03
	0.1	06/23/1997	1350	0.78	0.51	0.06	0.09	0.05	0.17	1.1	1.32	0.06	0.04
	0.1	07/21/1997	1420	1.47	0.26	0.15	0.09	<0.02	0.03	0.6	0.63	0.18	0.02
	0.1	08/25/1997	1100	1.4	0.12	0.07	0.11	0.02	0.05	0.7	0.77	0.04	0.03
	0.1	09/14/1997	1245	0.91	0.07	<0.05	0.05	0.18	0.17	0.9	1.25	0.21	0.06
Average				0.85	0.24	0.09	0.08	0.22	0.09	0.98	1.25	0.10	0.03
KA - 3	0.1	04/20/1998	1250	0.17	0.05	<0.05	<0.04	0.22	0.36	0.5	1.08	0.07	0.07
	0.1	05/10/1998	1406	0.1	<0.05	<0.05	<0.04	0.09	0.26	0.9	1.25	0.06	0.03
	0.1	06/14/1998	0933	0.36	<0.05	0.13	0.05	0.02	0.37	1	1.39	0.07	0.04
	0.1	07/12/1998	1505	0.73	<0.05	0.25	0.07	<0.02	0.03	1	1.03	0.1	0.02
	0.1	08/10/1998	1414	0.8	0.25	0.12	0.09	0.03	0.49	0.7	1.22	0.23	0.07
	0.1	09/07/1998	1415	0.65	0.06	0.1	0.07	0.03	0.12	1.7	1.85	0.65	0.04
Average				0.47	0.12	0.15	0.07	0.08	0.27	0.97	1.30	0.20	0.05
KA - 3	0.1	04/19/1999	0930	0.15	<0.05	<0.05	<0.04	U	0.07	1.03	1.1	0.1	0.04
	0.1	05/09/1999	1418	0.19	<0.05	<0.05	<0.04	0.2	0.1	1.23	1.53	0.09	0.08
	0.1	06/20/1999	1407	0.54	<0.05	0.18	0.05	U	0.4	0.84	1.24	0.1	0.02
	0.1	07/11/1999	1320	0.66	0.07	0.26	0.07	U	0.21	1.14	1.35	0.08	0.03
	0.1	08/15/1999	1447	0.82	0.1	0.16	0.06	U	0.39	0.98	1.37	0.14	0.09
	0.1	09/12/1999	1149	0.79	0.13	0.19	0.05	U	0.46	0.89	1.35	0.21	0.11
Average				0.53	0.10	0.20	0.06	0.20	0.27	1.02	1.32	0.12	0.06

Station	Depth M	Date mm/dd/yyyy	Time hh/mm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
KA - 3	11	06/30/1996	1832	1.46	0.11	0.52	0.09						
	17	07/15/1996	1622	3.6	0.1	<0.05	0.14						
	13	08/19/1996	1558	1.76	<0.05	0.33	0.24						
	9	09/17/1996	1244	1.52	0.08	0.19	0.16						
Average				2.09	0.10	0.35	0.16						
KA - 3	11	04/27/1997	1341	0.25	0.06	0.06	0.05	0.11	0.02	1.1	1.23	0.02	0.02
	10	05/21/1997	1810	0.34	<0.05	<0.05	<0.04	0.65	0.02	1.4	2.07	0.09	0.04
	10	06/23/1997	1400	0.6	0.31	<0.05	0.06	0.19	0.27	1.1	1.56	0.07	0.04
	10	07/21/1997	1430	1.75	0.4	1.1	0.12	0.08	0.05	0.8	0.93	0.07	0.02
	12	08/25/1997	1112	1.28	0.14	0.12	0.08	0.23	0.05	0.9	1.18	0.09	0.05
	9.5	09/14/1997	1255	1.03	0.14	0.07	0.1	0.21	0.19	1.5	1.9	0.17	0.09
Average				0.88	0.21	0.34	0.08	0.25	0.10	1.13	1.48	0.09	0.04
KA - 3	12	04/20/1998	1302	0.17	0.06	<0.05	<0.04	0.35	0.35	0.6	1.3	0.08	0.07
	10	05/10/1998	1416	0.11	<0.05	<0.05	<0.04	0.34	0.26	1.2	1.8	0.06	0.05
	10	06/14/1998	0943	0.39	<0.05	0.13	0.05	0.02	0.45	1.1	1.57	0.09	0.05
	10	07/12/1998	1515	0.6	0.1	0.23	0.08	0.15	0.35	1.2	1.7	0.37	0.07
	12	08/10/1998	1426	0.77	0.15	0.15	0.09	0.1	0.41	1.7	2.21	0.29	0.06
	12	09/07/1998	1427	0.71	<0.05	0.09	0.06	0.19	0.55	1.1	1.84	0.17	0.15
Average				0.46	0.10	0.15	0.07	0.19	0.40	1.15	1.74	0.51	0.08
KA - 3	12	04/19/1999	0942	0.17	<0.05	<0.05	<0.04	0.06	0.06	0.99	1.11	0.12	0.05
	9	05/09/1999	1427	0.23	<0.05	<0.05	<0.04	0.23	0.1	1.13	1.46	0.1	0.06
	10	06/20/1999	1417	0.57	<0.05	0.21	0.07	0.17	0.41	3.93	4.51	1.34	0.07
	10	07/11/1999	1330	0.69	<0.05	0.21	0.09	U	0.17	1.89	2.06	0.24	0.06
	8	08/15/1999	1455	0.81	0.12	0.18	0.05	0.02	0.45	0.9	1.37	0.13	0.1
	8	09/12/1999	1157	0.76	0.09	0.17	0.05	U	0.48	0.89	1.37	0.19	0.11
Average				0.54	0.11	0.19	0.07	0.12	0.28	1.62	1.98	0.35	0.08
KA - 6	0.1	06/30/1996	1740	3.02	0.29	0.52	0.22						
	0.1	07/15/1996	1620										
	0.1	08/19/1996	1610	2.2	<0.1	0.2	<0.1						
	0.1	09/17/1996	1300	0.7	<0.05	0.05	0.07						
Average				1.97	0.29	0.26	0.15						
KA - 6	0.1	04/27/1997	1300	0.3	<0.05	<0.05	<0.04	<0.02	0.01	1.4	1.41	0.04	0.02
	0.1	05/21/1997	1822	0.24	<0.05	<0.05	<0.04	0.77	0.01	1.6	2.38	0.16	0.04
	0.1	06/23/1997	1413	0.7	0.39	0.05	0.07	0.02	0.15	1	1.17	0.11	0.04
	0.1	07/21/1997	1400	1.64	0.33	0.28	0.09	0.02	0.03	0.9	0.95	0.08	0.02
	0.1	08/25/1997	1025	0.81	0.17	0.12	0.06	0.2	0.29	1.2	1.69	0.14	0.09
	0.1	09/14/1997	1225	0.73	0.1	<0.05	0.06	0.04	0.07	1.8	1.91	0.09	0.06
Average				0.74	0.25	0.15	0.07	0.21	0.09	1.32	1.59	0.10	0.05

Station	Depth M	Date mm/dd/yyyy	Time hh/mm	Atrazine ug/L	Alachlor ug/L	Metolachlor ug/L	Cyanazine ug/L	Ammonia mg/L	NO3/NO2 mg/L	TKN mg/L	TN mg/L	T - Phos mg/L	T - Ortho-P mg/L
KA - 6	0.1	04/21/1998	0745	0.19	0.05	<0.05	<0.04	0.05	0.36	0.7	1.11	0.07	0.07
	0.1	05/10/1998	1340	0.08	<0.05	<0.05	<0.04	0.09	0.16	1.1	1.35	0.04	0.02
	0.1	06/14/1998	1940	0.48	<0.05	0.2	0.06	0.23	0.28	0.7	1.21	0.12	0.07
	0.1	07/12/1998	1445	2.57	0.33	0.9	0.17	<0.02	0.17	1.5	1.67	0.24	0.02
	0.1	08/10/1998	1355	0.71	0.19	0.13	0.08	0.09	0.44	1	1.53	0.41	0.12
	0.1	09/07/1998	1346	0.54	<0.05	<0.05	<0.04	0.14	0.23	2.7	3.07	0.88	0.05
Average				0.76	0.19	0.41	0.10	0.12	0.27	1.28	1.66	0.29	0.06
KA - 6	0.1	04/19/1999	1008	0.27	<0.05	<0.05	<0.04	U	0.3	1.25	1.55	0.15	0.04
	0.1	05/09/1999	1439	0.2	<0.05	<0.05	<0.04	0.15	0.1	1.1	1.35	0.08	0.05
	0.1	06/20/1999	1435	0.9	<0.05	0.33	0.07	U	0.22	1.92	2.14	0.17	0.03
	0.1	07/11/1999	1305	0.82	0.06	0.26	0.07	U	0.06	1.44	1.5	0.11	0.04
	0.1	08/15/1999	1459	0.78	0.14	0.19	0.07	0.36	0.4	0.92	1.68	0.14	0.12
	0.1	09/12/1999	1213	0.61	0.08	0.1	0.04	0.07	0.24	1.61	1.92	0.31	0.1
Average				0.60	0.09	0.22	0.06	0.19	0.22	1.37	1.69	0.16	0.06
KA - 6	1.5	06/30/1996	1742	3.03	0.34	0.51	0.24						
	1.5	07/15/1996	1622	2.01	<0.05	<0.05	<0.1						
	4	08/19/1996	1614	1.36	0.08	0.31	0.22						
	3	09/17/1996	1303	0.65	<0.05	0.07	0.08						
Average				1.76	0.21	0.30	0.18						
KA - 6	2.5	04/27/1997	1303	0.14	0.16	<0.05	<0.04	0.13	0.01	2.2	2.34	0.22	0.05
	3	05/21/1997	1825	0.26	<0.05	<0.05	<0.04	0.62	0.01	2.1	2.73	0.19	0.04
	3.5	06/23/1997	1417	0.78	0.4	<0.05	0.1	0.03	0.13	1.2	1.36	0.12	0.04
	2.5	07/21/1997	1403	1.88	0.44	0.37	0.11	0.19	0.08	1.1	1.37	0.16	0.06
	4	08/25/1997	1029	0.99	0.1	0.12	0.06	0.16	0.63	1.9	2.69	0.34	0.11
	2.5	09/14/1997	1228	0.73	0.06	0.07	0.06	0.13	0.07	3.3	3.5	0.38	0.21
Average				0.80	0.23	0.19	0.08	0.21	0.16	1.97	2.33	0.24	0.09
KA - 6	3	04/21/1998	0748	0.21	<0.05	<0.05	0.31	0.06	0.37	0.7	1.13	0.1	0.08
	2	05/10/1998	1342	0.1	<0.05	<0.05	<0.04	0.17	0.14	1.5	1.81	0.1	0.02
	3	06/14/1998	1943	0.44	<0.05	0.18	0.04	0.28	0.24	3.1	3.62	0.34	0.07
	3	07/12/1998	1448	2.66	0.44	0.91	0.18	0.24	0.39	2.2	2.83	0.39	0.03
	3.5	08/10/1998	1359	0.65	0.2	0.1	0.08	0.2	0.25	2.3	2.75	0.8	0.15
	3	09/07/1998	1349	0.55	<0.05	<0.05	0.04	0.18	0.41	0.6	1.19	0.24	0.14
Average				0.77	0.32	0.40	0.13	0.19	0.30	1.73	2.22	0.33	0.08
KA - 6	3	04/19/1999	1011	0.25	<0.05	0.06	<0.04	U	0.27	2.09	2.36	0.35	0.03
	3	05/09/1999	1442	0.22	<0.05	<0.05	<0.04	0.15	0.1	1	1.25	0.08	0.04
	3	06/20/1999	1438	0.9	<0.05	0.29	0.09	0.15	0.22	2.13	2.5	0.37	0.05
	3	07/11/1999	1308	1.05	0.08	0.32	0.08	0.14	0.03	3.31	3.48	0.77	0.1
	3	08/15/1999	1502	0.75	0.1	0.15	<0.04	0.04	0.44	1.03	1.51	0.18	0.12
	2	09/12/1999	1215	0.62	<0.05	0.12	<0.04	0.17	0.23	1.69	2.09	0.28	0.1
Average				0.63	0.09	0.19	0.09	0.13	0.22	1.88	2.20	0.34	0.07